Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

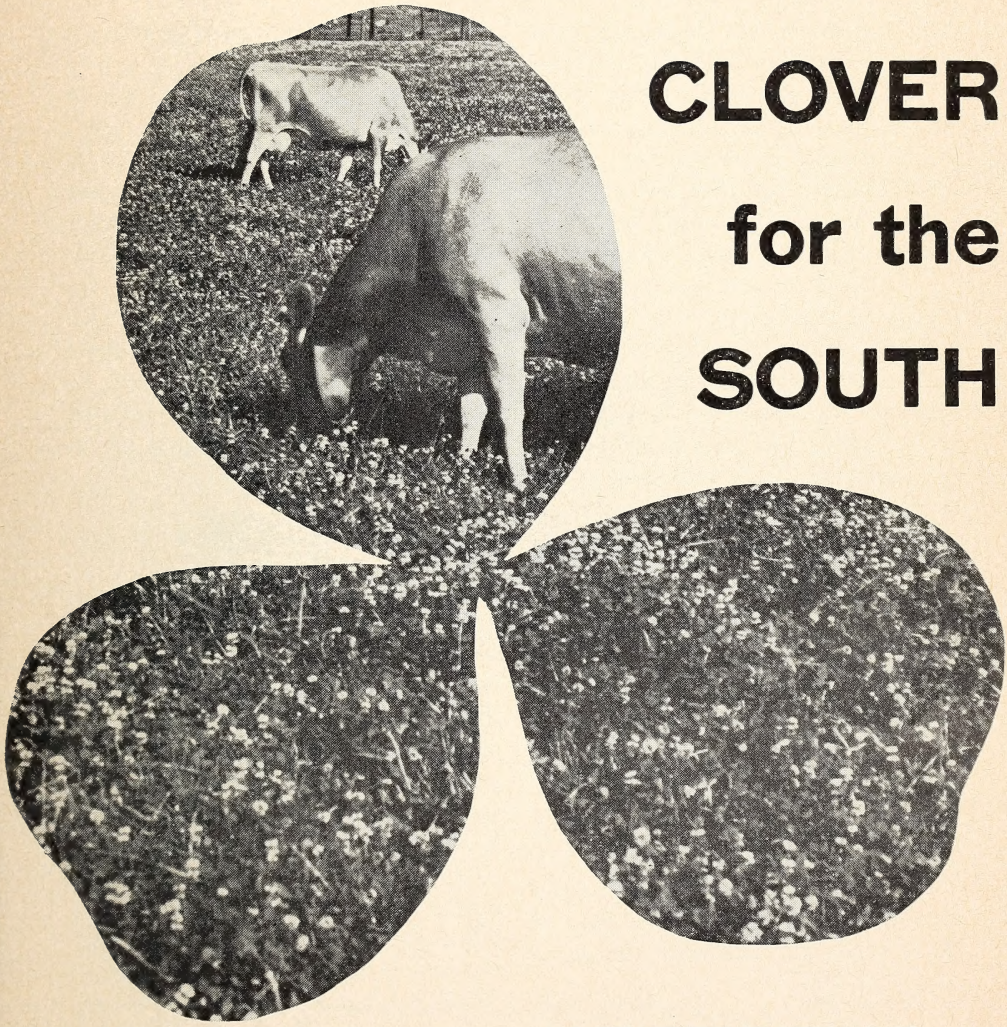
1
Ag84L
Cop. 2

498

LEAFLET NO. 498

U. S. DEPT. OF AGRICULTURE
LIBRARY
DEC 6 - 1961
CURRENT SERIAL RECORDS

WHITE CLOVER for the SOUTH



U.S. DEPARTMENT OF AGRICULTURE

WHITE CLOVER for the SOUTH

Information for this publication was furnished by the Crops Research Division, Agricultural Research Service

White clover [1] is grown in most parts of the United States. Because of the wide range of conditions to which the crop is adapted, cultural practices differ in several ways. Recommendations in this leaflet apply to three parts of the South, which are outlined on the map on page 3. White clover is the leading pasture legume in these areas.

White clover spreads by creeping fleshy stems that root at the nodes. Most of the leaves are composed of three leaflets, and they develop from the crown and from the nodes of the stems. Flower heads are borne on separate stalks, and are composed of 40 to 100 or more white to pinkish florets. White clover seeds are roundish and yellow to reddish yellow. Seeds are very small; there are about 700,000 per pound.

White clover is a perennial legume, but it may behave as a winter annual or biennial under certain conditions. In the lower parts of the region shown on the map, it generally behaves as a winter annual. There is some growth throughout the year in this part of the region, but normally the seeds germinate in the fall, and plants grow throughout the winter and early spring and they set seed and die in early summer.

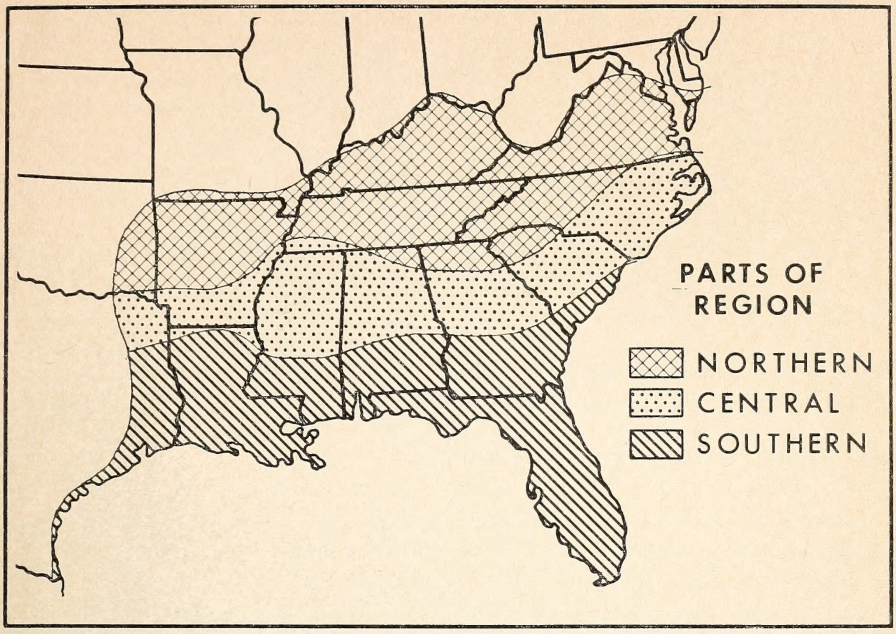
White clover is used primarily as a pasture plant. Usually, it is grown in association with grasses and other legumes. It may be seeded alone when used as a pasture plant for swine or poultry or when grown as a seed crop. It is seldom seeded alone for any other purpose. It may be made into high-quality hay and silage, and is an excellent cover and green-manure crop.

ADAPTATION

White clover grows best in cool, moist weather. Dry, hot weather limits growth and plant survival. It is best adapted to soils ranging from clay to silty loams. White clover will grow in low-lying sandy soils, but it is not recommended for sandy soils that are droughty or low in fertility. While it will grow in slightly acid to medium acid soils, it yields better and is more persistent when grown in soils where the pH reaction is above 6.0.

White clover may not perform

[1] *Trifolium repens.*



The region to which recommendations in this leaflet apply comprises three parts of the South, which are outlined on this map.

satisfactorily in any area unless an adapted variety is planted and culture includes proper fertilizing, liming, inoculation, grazing, and clipping.

VARIETIES

Varieties of white clover may be divided into three types: large, intermediate, and small. There is variation within each type; a naturalized variety of one type may contain plants of one or both of the other types. Bred varieties are usually more uniform in type. A representative plant of the large type may have leaves, stems, and flowers two to four times as large as those of a representative intermediate plant, and about six times as large as those of plants of the small type.

Varieties of the large and intermediate types are the most satisfactory in the region; they perform better than any of the small-type white clovers. Following are descriptions of the varieties generally recommended.

Intermediate Type

Louisiana S–1.—Developed by the Louisiana Agricultural Experiment Station and released in 1951. In trials, it has produced greater yields of forage than any other strain or variety of the intermediate type. Stands persist longer into the hot summer months than other varieties. It sets an abundance of seed for reseeding in the fall.

Nolin white.—Exact origin not known, but it occurred in a field near Hamburg, La., where various

white clover strains had been planted for observation. Under some conditions it appears to be more vigorous than Louisiana white, and more persistent under grazing.

Ala-Lu.—A naturalized variety that developed on a farm near Tuskegee, Ala., by natural selection. It was named in 1950. It is similar to other naturalized varieties.

Green Acres.—A natural variety that originated in western Kentucky.

Louisiana white.—Any common white clover, the seed of which is harvested in Louisiana, is given the name Louisiana white. Seed lots could be from naturalized white clover that has been growing in Louisiana many years; lots also could be from plantings made the previous fall with seed of other origin. Probably most seed sold as Louisiana white is from adapted plants; it is unlikely that seed from other sources would produce a seed crop worth harvesting. Most plants in a lot of Louisiana white clover are of the intermediate type; there are some plants of the small and large types. Other naturalized varieties are similar to Louisiana white in performance and persistency.

New Zealand white, Idaho white, Wisconsin white, and other varieties that originate in cooler climates are sometimes seeded in the region. They are not recommended for the southern and central parts of the region because they do not yield well and they do not develop enough seed for reseeding.

Large Type

Ladino and Pilgrim are the only large-type varieties that are important in the region. Use of both varieties is restricted because in some parts of the region they do not set sufficient seed for satisfactory fall reseeding.

- Ladino does not reseed satisfactorily in the southern part of the region.
- Ladino does not reseed satisfactorily in the central part of the region unless the seed is from the correct source: south central California.
- Pilgrim does not reseed satisfactorily in the southern or central parts of the region.

In the northern part of the region, the Ladino and Pilgrim varieties will produce crops that satisfactorily reseed themselves.

Ladino is the most extensively used variety in the central and northern parts of the region. It produces high yields in the southern part of the region, but if used there it should be reseeded each fall. Most commercial seed production of Ladino is in the Western States.

Get variety recommendations for your area from your county agricultural agent or your State agricultural experiment station. None of the varieties have seed that can be distinguished from the seed of any other variety; certified seed must be used to insure trueness to variety.

SEEDBED PREPARATION

White clover seedings may be made in tilled soil or in established grass sod. For either type of seeding, prepare a seedbed that is firm, smooth, and free of weeds.

To prepare tilled soils—

- Plow, disk, and harrow.
- Compact the surface with a corrugated roller.

To prepare established grass sod—

- Clip the grass or permit livestock to graze it closely, or burn the grass if there is heavy accumulation of top growth.
- Cut the sod with a disk.

SEEDING

Broadcasting and drilling are satisfactory methods of seeding. Broadcast seed may be covered by rolling with a corrugated roller or left uncovered—the first rain will wash soil over the seed and cover it. Drilled seed should be deposited on the surface or planted shallow; depth of planting should be not more than one-eighth inch.

Sod seeders usually work well except on exceptionally thick turfs. On such turfs it may be better to thoroughly disk, roll, then broadcast the seed.

In the southern part of the region, summer-growing perennial grasses in which white clover seedings are made include dallisgrass, bermudagrass, bahiagrass, pangolagrass, and carpetgrass.

In the rest of the region most sod seedings are made in bluegrass, orchardgrass, or tall fescue. These and other tall grasses should be closely grazed or clipped, or burned, the fall preceding the seeding.

In most years the best seeding date in each part of the region will be in the following range of dates:

In the southern part of the region, between October 1 and December 1.

In the central part of the region, between September 15 and November 1.

In the northern part of the region, between February 20 and March 15.

The best time to seed within the range of dates listed for your part of the region depends primarily on soil moisture; seed when there is enough moisture in the soil to germinate the seed and to give the young seedlings a strong start. Seedings will succeed on clay soils with less rainfall than seedings on sandy soils; clay soils retain moisture better. Adequate moisture is particularly important in most of the southern part of the region; sandy-soil types are widespread there.

Recommended rates of seeding vary from 1 to 7 pounds per acre. Consult with your county agricultural agent for recommended seeding rates for your area.

Plant seed that has been inoculated with appropriate inoculation culture. Information about legume seed inoculation is given in USDA Farmers' Bulletin 2003, "Legume Inoculation: What It Is—What It Does."

MANAGEMENT

Grazing

Competition from the companion crop is usually the primary management problem while white clover is in the early stages of growth. Companion crops may compete strongly enough to reduce the white clover stand. If the companion crop dominates the white clover, grazing or clipping should help the white clover to become established. If the young plants are grazed, permit animals to graze only enough to reduce competition from the companion crop. After the white clover seedlings become well established and the stolons develop, grazing may be more intense.

Maintaining a balance between white clover and other plants in the mixture remains a management problem throughout the life of the

pasture. If the associated plants become too tall and rank, they will inhibit growth of the white clover. If growth is more rapid than can be utilized by grazing, the excess can be made into either hay or silage. An occasional clipping to make growth more uniform and to control weeds is desirable.

Following is a summary of practices and conditions that affect the composition of white clover plants and grass plants in a mixed pasture.

Practices or conditions that tend to cause the plant population to shift more to grass:

- Application of nitrogen fertilizer.
- Undergrazing that permits grass to grow above clover.
- Lack of lime, phosphate, and potash.
- Permitting grass to mature seed.
- Overgrazing during drought.

Practices or conditions that maintain white clover or cause the plant population to shift to more clover:

- Preventing grass from growing too tall, either by grazing or by harvesting forage for hay or silage.
- Withholding nitrogen fertilizer.
- Adequate applications of lime, phosphate, and potash.
- Mowing to eliminate weeds and undergrazed tall grass.

Scattering animal droppings with a disk or harrow will result in a more uniform growth of the pasture. If you want the white clover to reseed itself, however, do not scatter the droppings until after the seed heads contain many mature seeds. Animals do not graze around their droppings. Thus, leaving droppings undisturbed until after the seed crop is mature assures an abundance of seed required in the establishment of the volunteer stand.

Preventing Bloat

White clover will cause bloat in cattle and sheep, but in this respect it is not different from many other legumes. The exact cause or causes of bloat are not known. Until more information is available and control methods developed, care must be exercised at all times.

In general, the incidence of bloat is greatest when the growth is succulent and is three or more inches in height. In some locations the incidence of bloat is highest during bright, warm weather immediately following cloudy, rainy periods. Less bloat occurs when animals graze grass-legume mixtures that contain at least 40 percent grass, than when they graze straight clover.

Do not turn hungry cattle or sheep into a rank, lush stand of clover; give them a fill of dry hay or straw first. Keep a rack of grass, hay or straw in each field where the animals have ready access to it.

Consult your State agricultural experiment station for recommendations on the use of antibiotics and other preventative methods which have reduced the incidence of bloat for at least short periods.

LIMING AND FERTILIZING

When lime is needed to make the soil less acid and to supply calcium, it is generally applied at rates of 1 to 4 tons per acre. The amounts of phosphorus and potassium needed generally are in the range of 300 to 600 pounds of 20 percent superphosphate and 60 to 250 pounds of muriate of potash, or their equivalents. In certain sections minor elements are necessary for the highest yields of forage and seed.

Recommended rates of application vary widely; consult your county agricultural agent or State agricultural experiment station for recommendations for your fields.

Lime and fertilizer generally are applied shortly before the seedbed is prepared; they are then worked into the soil during seedbed preparation.

DISEASES AND INSECTS

Many organisms produce diseases of white clover that reduce yields and persistence. Diseases of the foliage are the most conspicuous, but usually they are not as destructive as diseases of the roots and stolons.

Fungi cause foliage diseases and stolon, root, and crown rots.

Several viruses infect white clover. Some viruses are spread by insects, and the degree of infestation may depend on kind and number of insects present.

Species of root-knot nematodes are among the most common of the many kinds of nematodes that parasitize white clover. Nematodes cause swellings or galls on the roots that resemble the nodules produced by nodule bacteria.

Few disease control measures can be recommended. Two general recommendations are—

- Grow adapted varieties.
- Rotate crops when feasible to control root and stolon rots and nematodes.

Many foliar diseases can be controlled if livestock are permitted to graze heavily enough to prevent accumulation of heavy top growth. Grazing or clipping foliage heavily attacked by leafspot organisms often reduces the number of diseased leaves in the regrowth. Damage from crown rot can be reduced somewhat by grazing or clipping in late fall to remove infected leaves and reduce the amount of foliage that mats down on the stolons and crowns over winter.

Insects that damage white clover include the clover leaf weevil, the lesser clover leaf weevil, the clover head weevil, lygus bugs, the potato leafhopper, the garden fleahopper, the clover root curculio, and the green June beetle.

Spider mites often damage white clover.

Slugs, although not insects, may cause damage.

For information regarding the control of white clover insects, consult your county agricultural agent or your State agricultural experiment station, or write to the U.S. Department of Agriculture, Washington 25, D.C.

SEED PRODUCTION

Seed setting usually is heavy if there is an abundance of bees for cross-pollination, and if weather is warm and dry during the flowering period.

The white clover flower is self-sterile; it will not develop seed unless it is cross-pollinated. Bees, in collecting nectar and pollen, do the cross-pollinating. Cloudy, rainy weather over prolonged periods reduces flowering and retards bee visits to flowers.

Northern varieties do not flower, or flower only sparsely, in the central and southern parts of the region. Most frequently in the southern part of the region, northern varieties do not even set enough seed during the summer to establish a stand of volunteer plants in the fall.

If the crop is grazed during the

winter and early spring, remove the animals in late March or early April. If the crop is not uniformly grazed, clip it. Removing uneven and excessive top growth at this time, which is about 6 weeks before full bloom normally occurs, assures more uniform flower and seed development. It also reduces weed growth.

Using selective herbicides in late March or early April is recommended if there are many weeds or other crops that may produce seeds that will contaminate the white clover seed. It is better to use herbicides early in the season than to depend solely upon cleaning and processing after harvest. Consult your State agricultural experiment station for chemical weed control recommendations.

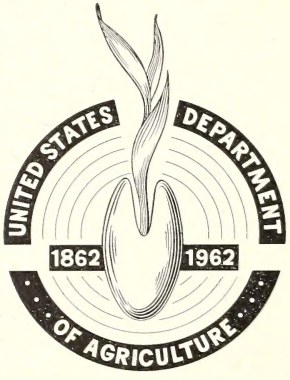
Since white clover blooms over a long period, ripe seed and florets in full bloom occur on the same plant. Harvest the seed crop when the greatest number of seed heads are light brown in color. This condition usually occurs 25 to 30 days after full bloom.

Cut the seed crop with a mower. Let it cure in the swath or in small windrows. During showery weather, the mowed crop cures better in swaths than in windrows. Windrowing is better during clear, warm weather because it reduces harvesting losses. Handle the cut crop as little as possible; each handling causes shattering losses.

Pick up the swathed or windrowed crops with a combine equipped with a pickup attachment. Operate the combine carefully to do a good harvesting job and to reduce harvesting losses. Travel at the correct rate of forward speed and properly adjust the concave and screens and the cylinder speed. For instructions, see your operator's manual.

Artificial drying or drying by spreading the seed thinly under cover improves the quality of the seed. If the seed is spread thinly under cover, turn it every few days until it is completely dry. Rough cleaning reduces the time required for drying and improves quality.

Defoliation of the seed crop is not a dependable practice.



Growth Through Agricultural Progress

Washington, D.C. Issued November 1961

U.S. GOVERNMENT PRINTING OFFICE: 1961

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington 25, D.C. - Price 5 cents